



Socioeconomic status and fertility decline

Insights from historical transitions in Europe and North America

Dribe, Martin; Breschi, Marco; Gagnon, Alain; Gauvreau, Danielle; Hanson, Heidi; Maloney, Thomas; Mazzoni, Stanislao; Molitoris, Joseph John; Pozzi, Lucia; Smith, Ken; Vezina, Helene

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⁷University of Quebec at Chicoutimi

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22007 / Lund, Sweden. Martin.Drice@ekn.lu.se.
Marco Breschi, Stanislao Mazzoni and Lucia Pozzi are at the Department of Economics and Business, University of Sassari, Italy.
Alain Gagnon is at the Department of Demography, University of Montreal, Canada. Danielle Gauvreau is at the Department of
Sociology & Anthropology, Concordia University, Canada. Heidi A. Hanson and Ken R. Smith are at the Huntsman Cancer Institute,
University of Utah, USA. Thomas N. Maloney is at the Department of Economics, University of Utah, USA. Joseph Molitoris is at the
Department of Sociology, University of Copenhagen, Denmark. H  lene V  zina is at the Department of Humanities, University of
Quebec at Chicoutimi, Canada.

1. Introduction

Across the western world, there were dramatic changes in family life near the turn of the twentieth century. Following sustained increases in human longevity, family size more than halved during the great fertility decline (see Coale and Watkins 1986). These changes during the demographic transition had a profound impact on the lives of ordinary people, similar to the Neolithic and industrial revolutions. Despite this importance we still lack a clear understanding of this process and the crucial mechanisms behind this change. Many theories stress the importance of education, women's relative wages and independence, mortality decline, new attitudes and norms, secularization, etc., but the empirical picture is less detailed (see, e.g., Hirschman 1994; Schultz 2001; Guinnane 2011).

Crucial to understanding the fertility decline is the differences in fertility according to socioeconomic status (SES) and how they evolved over the fertility transition (see Dribe et al. 2014c). There is a widespread view in the literature that higher social status was associated with high fertility in pre-transitional populations, but that this situation reversed during, or even well before, the transition began (e.g., Livi-Bacci 1986; Skirbekk 2008; Clark and Cummins 2015). This change has been explained by the higher social groups acting as forerunners to the decline (Haines 1989a, 1992; Dribe et al. 2014a). However, these generalizations are based on rather thin empirical grounds. With some notable exceptions (e.g., Haines 1977, 1992), there are few studies that have examined SES differentials in fertility over the entire transition and in different countries to identify common patterns. Moreover, there is little empirical evidence based on longitudinal micro-level data in which marital fertility can be followed over time. There has been, however, research on Britain, using individual-level census data and indirect estimation of fertility to look at the interaction between geography and social class (Garrett et al. 2001), as well as on the relationship of the number of surviving children and the wealth of parents at the time of death (Clark 2007; Clark and Cummins 2015).

In this study we extended the present body of research by studying SES differentials in marital fertility in a comparative perspective using micro-level economic-demographic data for five communities/areas in Sweden, Italy, the United States and Canada. The study covered the period from the early nineteenth to the mid-twentieth centuries, as opposed to a recent comparative study using individual-level cross-section data (Dribe et al. 2014a). Using these rich data sources enabled a careful analysis of the relationship between SES and fertility and how it evolved during the demographic transition. Better knowledge of these patterns can inform us about important determinants of the fertility transition.

The main contribution of this study was the comparative perspective using longitudinal individual-level data with identical class schemes to measure SES. This allowed for a careful analysis of marital fertility, distinguishing first births and higher-order births, and thus provided a more solid knowledge base than was available from previous research. Our results offer both confirmation and refutation of previous interpretations of fertility and SES during the fertility decline. Specifically, we show that higher occupations (elite groups, professionals and managers) led the fertility decline in all populations under analysis, but they did not universally have higher fertility to start with. Furthermore, farmers and

unskilled labourers were generally laggards in the decline, and these patterns were consistent across quite different contexts.

2. Theory and previous research

Previous research supports an interpretation that connects fertility decline with broad socioeconomic changes occurring in the late nineteenth and early twentieth centuries following the transition from an agricultural-based economy to an industrial economy (see Alter 1992; Schultz 2001; Guinnane 2011). This transition involved a sustained mortality decline, increasing levels of urbanization, an expansion of education and a growing number of women in the workforce. The question remains how these changes affected different socioeconomic groups.

Considering the fertility decline in France, Germany, Britain, Norway and the United States using cross-sectional data mainly from censuses, Haines (1992) showed that the socioeconomic differentials, measured by occupation, generally widened during the transition. Fertility decline in all of these countries except France was led by the middle and upper classes, whereas the agrarian populations were slower to change. It is unclear, however, whether this pattern was the result of socioeconomic changes first affecting the upper and middle classes or if it was related to a diffusion of innovations from upper to lower social strata.

European elite groups often showed declining fertility well before such change was apparent in the general population, which at least partly was connected to urban residence (Livi-Bacci 1986; Bardet 1990; Perrenoud 1990). However, it remained uncertain whether urban life created special preconditions for fertility in terms of socioeconomic or cultural environment or if the cause was something more specific to the elite groups. Similarly, Clark (2007) showed that the number of surviving children was higher among wealthier people (at the time of their death) in preindustrial England, but these differences diminished well before the fertility transition (see also Clark and Cummins 2009, 2015). Similar findings have been made for France (Cummins 2013) and England using occupational data from family reconstitutions (Boberg-Fazlic et al. 2011). There is also evidence from other contexts of low fertility in high-status groups in pre-transitional society (e.g., Sogner et al. 1984; Schneider and Schneider 1996). In his study of socioeconomic fertility differentials in Britain during the fertility decline, which used aggregated data from the 1911 census, Szreter (1996) stressed the interplay between geography and social class. At the same time he downplayed the importance of socioeconomic differentials in fertility during the transition, at least in the way they were represented by contemporary social class schemes (see also Barnes and Guinnane 2012; Szreter 2015 for a discussion of this interpretation). A similar argument was also made by Garrett et al. (2001) based on a more detailed analysis of SES and fertility in different British localities in the period 1891–1911. Woods (2000, pp. 116–21), on the other hand, stressed that while there certainly were class differences in marital fertility in Britain around the turn of the twentieth century, the decline occurred among the different classes at more or less the same time.

From a theoretical point of view, Coale (1973, later developed by Lesthaeghe and Vanderhoeft 2001) identified three conditions for fertility decline, namely, that people must be “ready, willing, and able” (the RWA model). Concerning readiness (family limitation must be viewed as advantageous from an economic and social point of view), the demand and supply of children are important in explaining both the high levels of pre-transitional fertility and the decline in fertility once the transition began (Easterlin 1975; Easterlin and Crimmins 1985). The supply of children reflects natural fertility and child survival. High mortality in pre-transitional populations (low supply) with a high demand for children implied that demand may well have exceeded supply. Following the mortality decline, the supply of children increased, which contributed to the decline in fertility (Galloway et al. 1998; Haines 1998; Reher 1999; Reher and Sanz-Gimeno 2007).

A changing demand for children may have been equally important to the fertility decline (Mosk 1983; Crafts 1984; Schultz 1985; Galloway et al. 1994; Brown and Guinnane 2002; Dribe 2009). The demand for children depended on family income and the cost of children in relation to other goods that were directly related to SES. Following industrialization and urbanization, the motivation to have children changed, and this can be expected to have affected SES groups differently. On the one hand, higher consumption aspirations among high status groups would have increased opportunity costs of childbearing and therefore contributed to a reduced demand for children. On the other hand, because children could help working in the fields or assisting in supplementary activities from a relatively early age, the economic benefits of children may also have been higher among low and middle SES families in rural contexts (i.e., among farmers and agricultural labourers). There is thus reason to expect a delayed fertility decline among the latter groups.

To the extent that industrialization and urbanization increased returns to education, demand for child quality would also have increased (Becker 1991). This increased demand would have led families to substitute quality for quantity by having fewer children and investing more in each child. This quantity-quality trade-off can be expected to have emerged in the aspiring middle class first, partly because of a higher return to education and partly because of better knowledge and information concerning the new conditions. In the urban working class children’s labour contribution remained important longer and may have contributed to a delayed decline in fertility. Empirical studies have also confirmed that smaller family sizes in the demographic transition became increasingly connected to socioeconomic upward mobility for children (Van Bavel 2006; Bras et al. 2010; Van Bavel et al. 2011; Molitoris 2015).

The ability to control fertility requires knowledge about contraceptive methods, which most research seems to assume to have existed well before the fertility decline, though it is unclear to which extent such methods were actually practiced within marriage (McLaren 1990; Santow 1995; Van de Walle and Muhsam 1995; Szreter 1996; Van de Walle 2000). It is important to note, however, that the fertility transition in the Western world took place before the widespread introduction of modern contraceptives (David and Sanderson 1986; Szreter 1996, pp. 389–424; Szreter and Garrett 2000).

The distinction between willingness and ability is crucial. The mere fact that people were able to limit fertility does not mean that they were willing to do so. What was required was a change in attitudes making it socially and culturally acceptable to practice contraception within marriage (see Carlsson 1966; Lesthaeghe 1980; Cleland and Wilson 1987; Lesthaeghe and Surkyn 1988; Cleland 2001). This process involved considerable social interaction in communities or networks transcending geographical boundaries (Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Szreter 1996; Casterline 2001; Garrett et al. 2001; Kohler 2001; González-Bailón and Murphy 2013). In his theory of innovation-diffusion more generally, Rogers (1962) identified the following five groups in the diffusion process with strong links to SES: innovators (highest SES); early adopters (high SES); early majority (average SES); late majority (below average SES); and laggards (lowest SES). Viewing deliberate family limitation in marriage as an innovation, we would expect to find a clear gradient in the decline of marital fertility going from highest to lowest SES. We would also expect that higher-status social groups would be more likely to formulate and adopt these new ideas because they were culturally more open, and they increasingly felt it important to distinguish themselves from the lower classes (Frykman and Löfgren 1987; Van de Putte 2007). The middle class and elite groups can also be expected to have been better able to acquire new knowledge concerning methods of birth control to the extent that these methods were not generally known before.

A crucial feature of the RWA model is that all conditions needed to be fulfilled in order to initiate fertility decline. This implies that the latest fulfilled condition would have determined the start of the transition (Lesthaeghe and Vanderhoeft 2001; Lesthaeghe and Neels 2002). In relation to SES this implied that the group which first experienced the fulfilment of all conditions became the forerunner. In other words, family size was only reduced when families in a SES group perceived it as beneficial to have fewer children because the costs exceed the benefits, *and* limiting family size was acceptable from an ethical, cultural, and religious standpoint, *and* they had the necessary knowledge and means to control fertility. It is also important to stress that all aspects of this model, also readiness, can be diffused in a population much like a contagion process (Lesthaeghe and Neels 2002; for similar views see also Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Casterline 2001).

3. Data

The data came from five communities in Europe and North America: Scania in southern Sweden; Stockholm, the capital of Sweden; the town of Alghero on the island of Sardinia (Italy); a sample of the population in Utah in the United States; and the region of Saguenay in Quebec, Canada. These datasets have all been used in a large number of previous studies. The construction of the different datasets were not identical as they were based on different underlying sources (genealogies, population registers or family reconstitutions), which resulted in somewhat different sampling designs, for instance when it came to inclusion of childless women (not included in Utah). For our main analysis of higher-order births, however, this did not affect the analysis, while in the case of first births it only affected the risk population. The proportion of women in their first marriages who were childless at age

50 was five per cent in Alghero (1866–1935), eight per cent in Scania (1815–1939), and nine per cent in Saguenay (1840–1971).

3.1. Scania, Sweden

The data came from five rural parishes in southern Sweden, which were homogenous in terms of religion (see Bengtsson and Dribe 2014). These parishes had 3,900 inhabitants in 1830. By the end of 1939, this figure had increased to 6,300, which implied approximately the same rate of growth as in all Sweden. The selected parishes were compact in their geographical location, showing the variations that could occur in a society regarding size, topography, and socioeconomic conditions.

The dataset used was based on local population registers and church records, which included information on demographic events and migration for all members of households and families in households (Bengtsson et al. 2012). The population registers also included information on occupation. The vital events were checked against the birth and death registers to adjust for possible under-recording of events in the population registers. In this study, we used data from 1815, when the population registers began, to 1968, well after the fertility transition was completed. The data from the population registers were linked to poll-tax registers (*mantalslängder*) and income registers, which provided yearly information on occupation. The resulting database contained all individuals born in the different parishes or migrating to them. Instead of sampling particular cohorts, each individual was followed from birth or time of arrival in the parishes to death or migration out of the parishes.

3.2. Stockholm, Sweden

The data came from the Roteman's Archive, a longitudinal population register maintained between 1878 and 1926 by the municipal government (Geschwind and Fogelvik 2000). During this time, the city was the largest in Sweden, totalling over 300,000 by 1900. The sample contained all women between the ages of 15 and 49 and all individuals who were connected to them. Information on children, spouses, parents, lodgers or employers was available as long as those individuals were present in Stockholm during the ledger period. The data contained information on an individual's name, legitimacy, relation to the head of household, birthdate, marital status, and occupation. Using the information of an individual's position compared with the head of household, children could be matched to their mothers (see Molitoris 2015).

The original extraction was restricted in several ways to analyse marital fertility. Though marital status was available, dates of marriage were inconsistently recorded and incomplete for many individuals. Because of this incompleteness, the data were only used to examine higher-order births (after the first birth). That is, a woman was considered to be at risk under the following conditions. First, she had to be listed as married. Second, she had to be between the ages of 15 and 49. Third, she was not considered to be at risk until she had one observed birth in the city. Individuals were censored upon migrating out of Stockholm, death, or the termination of marriage.

3.3. Alghero, Italy

Alghero is a coastal town in north-western Sardinia that, before national unification in 1861, formed part of the Kingdom of Sardinia together with the regions of Piedmont and Liguria. The first Italian census (1861) recorded Alghero as having 8,831 inhabitants, making it the fourth largest municipality on the island. In addition to the urban centre, the municipality included a vast area called “Nurra” that was marshy and barely inhabited until the 1920’s, resulting in Alghero’s geographic isolation. The demographic information was based on civil records of birth, death and marriage from 1866 to 1935. The demographic information derived from the civil status registers was combined with data from the parish registers of baptisms, burials and marriage. Cross-checking between these two sources was necessary considering the prolonged state-church conflict regarding marriage (Breschi et al. 2009; Mazzoni et al. 2013).

Birth histories were constructed based on the age of the mother and included 75 per cent of the total number of births (approximately 30,000) that occurred in Alghero from 1866 to 1935. Concerning marriages, there were two dates for many couples (72 per cent), reflecting the timing of their civil and religious ceremonies. When the dates of the two celebrations differed, the earliest date was used (see Breschi et al. 2014).

The information on occupation was derived from marriage certificates and, if missing (few cases), it was taken from other official records: birth and death certificates or census records. Occupations from marriage certificates were preferred because they were generally the most representative occupations over individuals’ lives in Alghero, a community where social mobility was very low (Breschi et al. 2010).

Alghero’s fertility decline was slow, and was not completed until the 1970s, much later than the rest of the country. Our analysis examines the period from 1866 to 1935 – a time when awareness of the problems of fertility decline was rising but, at the same time, was thwarted by the fascist regime (Ipsen 1996).

3.4. Utah, USA

Late nineteenth century in Utah, in the western United States, was characterized by rapid settlement primarily by members of the Church of Jesus Christ of Latter Day Saints (LDS) beginning in 1847. According to data from the U.S. Census Bureau, the resident population of the state grew from just over 11,000 in 1850 to over 200,000 by 1890, over 500,000 by 1930, and over 1 million by 1970. This rapid rate of growth reflected both high rates of natural increase and substantial immigration.

The data came from the Utah Population Database (UPDB, Pedigree and population resource 2012). The core of the UPDB included information on over 185,000 third-generation families identified on “Family Group Sheets” from the archives at the Genealogical Society of Utah. These genealogical records provided data on migrants to Utah and their Utah descendants born from the early 1800s to the mid-1970s. The UPDB sample used in this analysis included women born in Utah between 1850 and 1919 who were observed living in the state after age 15. We restricted the analysis to women who were married at age 14 or older, married only once and had at least one child (see Maloney et al.

2014). We also excluded a modest number of observations for data-consistency and link-quality reasons.

The information on occupation came from death certificates that were linked to genealogical records. The instructions for the U.S. Standard Death Certificate stated that the usual occupation meant the type of job the individual was engaged in for most of the working life. The usual occupation was not necessarily the highest paid job nor the employment considered the most prestigious but the occupation that represented the greatest number of working years.

Fertility rates in Utah were among the highest in the nation, certainly owing in part to the pro-natalist culture of the LDS Church as well as economic forces tended to raise fertility in the rural west relative to other parts of the U.S. However, substantial fertility decline was evident by the 1880s (Bean et al. 1990, pp. 135–6).

3.6. Saguenay (Quebec) Canada

The Saguenay region, located approximately 200 kilometres north of Quebec City, was characterized by a relative geographical isolation and cultural uniformity despite the presence of a small Aboriginal population. The colonization of the region by French Canadians began in the 1830s and the population grew rapidly from 5,574 in 1852 to 265,642 in 1971 (see Vézina et al. 2014). The population consisted mostly of farmers who combined farm work with logging the forests during the winter. Industrialization began slowly with the implantation of pulp industries at the turn of the twentieth century and progressed much faster with the arrival and expansion of important aluminium and hydro-electric plants before World War II (Igartua and de Freminville, 1983; Bouchard, 1996).

All births, marriages, and deaths that occurred in the region from the onset of colonization to 1971 were digitized and linked using family reconstitution methods to form the BALSAC population database (BALSAC Project, 2014). We used data on the reproductive history of all married women between 1842 and 1971. Further restrictions were applied to keep only women's first marriages and women whose birth date was known either directly through a birth certificate or indirectly when declared at another event. Finally, in the absence of information on migration, we excluded families where the existence of a child was only known by a subsequent death or marriage (no birth record).

We used information on occupation declared on the child's birth record, or when this was missing, on a previous birth record or on the marriage certificate. Information on occupation was available from at least one of these vital event records for 60 per cent of the families. Similar to other rural and remote regions in Quebec, the fertility transition in the Saguenay region occurred later than the fertility transition in the rest of the province and later than other parts of Canada (Pouyez et al. 1983; Gauvreau et al. 2007).

4. Methods

We used episode-structured data for these communities to estimate a set of nearly identical event-history models (we included a vital context-specific control in the case of Utah, LDS

membership, as well as somewhat differently specified controls for place of residence). All estimates were made using Cox proportional hazard models (the *stcox* command in STATA). Separate models were estimated for first births and higher-order births because first-birth risks are closely connected to union formation, especially in pre-transitional and early transitional contexts (Bengtsson and Dribe 2014). For first births, the duration was time between marriage and the first birth or censoring because of death or migration. For higher-order births, the duration was time since last birth. We controlled for a woman's age and geographic location of residence (differently defined in various contexts but typically some geographic unit), and in the higher-order birth models, we also controlled for the survival status of the previously born child (dead or alive). The main variables of interest were SES and the phase of the transition. The following four phases were defined in each context:

P1: Pre-transition

P2: Early-transition

P3: Late transition

P4: Post transition

Naturally, these phases corresponded to somewhat different time periods in different contexts (see table 1) but indicated similar phases of the demographic transition and should therefore be broadly comparable. The transition phases were identified based on the specific periodization of the demographic transition in each setting, but were not strictly defined based on means or variation in fertility levels. The pre-transition phase was the period before any signs of a secular fertility transition. The early transition phase was when fertility decline had started but not spread to the whole population. In the late transition phase there was a general fall in fertility, and the post-transition phase began when fertility evened out at low levels, usually around replacement. We did not have data covering all four periods in all the communities, but included the phases for which data were available. For the early-transition phase data were available for all populations. For the case of Stockholm we used roughly the same periodization as for the Swedish province of Scania.

SES was measured by the occupation of the husband. All occupations were coded in HISCO (Van Leeuwen et al. 2002), which is an internationally comparable coding scheme of occupations. Naturally, the exact meaning of different occupations differed across contexts, but the HISCO project has made a great effort in assessing the validity of the coding in different countries, and is, to our knowledge, the only available coding scheme of comparable quality. Occupations were then classified according to HISCLASS, which is a 12-category occupation classification scheme based on skill level, degree of supervision, the manual or non-manual character of the work, and whether it took place in an urban or rural context (Van Leeuwen and Maas 2011). HISCLASS contains the following classes: 1) Higher managers; 2) Higher professionals; 3) Lower managers; 4) Lower professionals and clerical and sales personnel; 5) Lower clerical and sales personnel; 6) Foremen; 7) Medium skilled workers; 8) Farmers and fishermen; 9) Lower skilled workers; 10) Lower skilled farm workers; 11) Unskilled workers; and 12) Unskilled farm workers. Due to a low number of observations in some classes, these 12 classes were grouped in the following five sub-classes:

1. Higher occupations: (1+2+3+4+5)
2. Skilled workers (6+7)
3. Farmers (8)
4. Lower skilled workers (9+10)
5. Unskilled workers (11+12)

Even though it did not mean exactly the same thing to be, for example, a farmer in different contexts, the basic characteristics of these classes were comparable across the populations. For instance, higher occupations performed high-skilled, white collar, tasks, and farmers worked land owned by themselves or rented from larger landowners or the state. Research has also shown that occupational ranking (based on prestige) is remarkably similar across countries and over time (Treiman 1977; Hout and DiPrete 2006), which seems to imply that at least in broader terms class schemes such HISCLASS capture important aspects of social stratification that can be compared across contexts. Having said this, however, some details and specificities are always obscured when forcing diverse contexts into a common framework like this.

In the analysis, we included interactions between the transitional phase and SES to obtain a better picture of how the socioeconomic differentials evolved over the transition and how the fertility decline differed between socioeconomic groups.

5. Results

5.1. Basic patterns

In Figure 1, age-specific marital fertility rates in the different populations are depicted, and in Table 1 the total marital fertility in ages 20–49 (TMFR20) is shown by transition phase and population. Examining Scania first, P1 shows a rather typical pre-transitional pattern with falling fertility by age in a relatively linear fashion, with high levels of marital fertility (approximately 500 per thousand) in the 20–24 age group. These high levels are explained by a close connection between marriage and the start of childbearing in many pre-transitional populations with high rates of pre-marital pregnancies (see Dribe et al. 2014b). Total marital fertility in Scania in this phase was 8.2. In the early-transitional phase, the shape of the curve is similar but the level is somewhat lower. In the later phases, fertility levels are much lower, and there is a decline in all age groups. In the final phase, total marital fertility has declined to 3.1. Naturally, the decline is largest in younger age groups measured in absolute terms, which is clearly visible in the figure; but in relative terms, the decline is strongest in the older age groups. For example, the fertility level in the late transitional phase (P3) is approximately 40–50 per cent of its pre-transitional level in ages over 30 but 75 per cent of the pre-transitional level in the lowest age group. Similarly, when comparing the post-transitional levels, they are approximately 10 per cent of their pre-transitional levels in ages over 40 and 40–50 per cent in ages below 30.

Utah shows a slightly different pattern than Scania's. In the pre-transitional phase, the fertility levels in the youngest age groups are slightly lower, which may be connected to

differences in marriage patterns and a weaker connection between marriage and the start of childbearing through, for example, lower prevalence of pre-marital conceptions. Over the transition, the levels decline considerably, but the overall shape of the curves remains similar. Total marital fertility is 7.3 in the early-transitional phase and 5.4 in the late-transitional phase. As is the case in Scania, fertility declines relatively more among the older age groups, but all age groups join the transition essentially from the beginning.

Turning to the Sardinian town of Alghero, fertility does not decline much between the two phases. Total marital fertility is 7.6 in the first phase and 6.9 in the second. In fact, when looking at the total population there is no indication of family limitation, i.e., parity-specific control. Instead, the population of Alghero controls marriage behaviour (late marriages and high levels of male and female celibacy) to limit the total number of births and adapt this number to the available resources (Corridore 1902; Breschi et al. 2012).

Pre-transitional Saguenay resembles southern Sweden the most in terms of levels, with marital fertility in the lowest age group approaching 500 per thousand. The shape is not as linear as in Scania and, in some ways, resembles Utah more than Scania. There is a pronounced decline in all age groups across the different transitional phases, with the largest relative change in the higher age groups. Total marital fertility declines from almost nine in the pre-transitional phase to less than four in the late transitional phase (making it more similar to the post-transitional phase in Scania than the late transitional phases in Scania or Utah).

Finally, examining Stockholm, the age pattern in the early transitional phase is somewhat different from the other populations, as it is concave rather than convex or linear as in the other populations. The level of marital fertility is lower than in Scania in the same period (6.6 compared to 7.7). There is a marked decline between the two phases with the greatest reduction in relative terms in the 30–44 age group. In the late transition phase the age pattern is also more similar to the Scanian one. Previous work using aggregated data has shown that Stockholm's population was among the first in Sweden to practice birth control (Dribe 2009), and the speed with which it declined was also substantially greater than for the rest of the country, cementing the capital as a forerunner of the overall Swedish decline (Molitoris and Dribe 2016).

Table 2 shows mean intervals from marriage to first birth and among higher-order births across phases and populations (Stockholm is excluded from the first-birth analysis because of missing information on age at marriage for many observations). In the pre-transitional phase, the first interval is the shortest in Scania (approximately 1 year), slightly longer in Saguenay and Utah (approximately 1.2 years) and the longest in Alghero (approximately 1.4 years). In all populations, we see that the time between marriage and first birth increases during the fertility transition. Similarly, higher-order birth intervals become prolonged in the transition from approximately 2.0–2.7 years to 3 years or more. This result points to spacing of births as an important part of the fertility transition, which has also been stressed in previous research (David and Sanderson 1986; Crafts 1989; Haines 1989b; Bean et al. 1990; Szreter 1996; Anderson 1998), though failed stopping also may have been partially responsible for the increase in the higher-order birth intervals.

5.2. Event-history analysis

The distributions of the main variables are shown in table 3. Clearly, there are large differences between the populations both in terms of the social structure and the distribution of the sample across transitional phases. Table 4 displays the overall hazard ratios (relative risks), with P2 as the reference category, in the different transitional phases for first births and higher-order births separately. The models control for SES, age of woman, place of residence, survival of previous child (higher-order births), and in the case of Utah, LDS status. Evidently, the patterns in the transition are highly similar across populations with a sharp decline in both first-birth risks and higher-order birth risks between P2 (early transition) and P3 (late transition). Fertility levels are approximately 30–50 per cent lower in P3 compared with P2, with the largest drop for higher-order births.

Figures 2 and 3 show hazard ratios by SES and transitional phase across populations, including 95-per cent confidence intervals. These results are net effects from interaction models with the unskilled in P2 serving as the reference category to which all other estimates are compared. In this way, we examine both differences between SES groups across populations in a given transitional phase, and within SES groups between transitional phases. First births and higher-order births are analysed separately in Figures 2 and 3 respectively.

In panel A of Figure 2, which shows the pre-transitional phase, the patterns differ across populations. In Utah, the unskilled have relatively long intervals (low birth risks) whereas they have short intervals in Scania and Alghero (high birth risks). In Alghero higher occupations have the longest intervals. Farmers are prominent with short intervals in Alghero and long intervals in Scania, and in Saguenay first birth risks are highly similar across SES groups. Therefore, it is difficult to find a consistent SES pattern in first births in the pre-transitional phase, which most likely is connected to differences among populations in the degree to which entry into parenthood was immediately connected to marriage through, for example, pre-nuptial pregnancies.

In the early-transitional phase (P2 in Panel B), the higher-occupations group emerges with the longest first-birth intervals (lowest birth risks) in all populations. Farmers have the shortest intervals in all populations except Scania. Apart from this result, there is not much difference by SES in most populations. Similarly, in the late transition (P3), long intervals of the higher occupations are clear in all three populations for which we have data, though the difference with the other groups is not large in Scania. In Utah and Saguenay there are clear SES gradients if farmers are removed, where lower SES is associated with higher first-birth risks in both populations. Farmers are also prominent with the highest first-birth risks. In the post-transitional phase (P4), we only have data for Scania, and they show a similar pattern to the late-transitional phase (P3). There is no clear gradient, and lower skilled workers and higher occupations have the lowest first-birth risks whereas the other groups have similar levels. Taken together, it seems clear that although there is considerable variation across populations in the SES differences in first-birth risks in all periods, higher occupations are always involved in fertility decline through prolonged intervals between marriage and first birth.

If we instead examine changes over time, or across transitional phases, first-birth risks decline sooner and faster among higher occupations in all populations (between P1 and P2). Unskilled workers experience considerable decline in first-birth risks both in Scania and Alghero, but it is a decline from initially higher levels than other groups. Among farmers, there is not much change between the pre- and early-transitional phases. With the exception of farmers in Saguenay, there is a pronounced decline in all SES groups between the early- and the late-transitional phases (P2 to P3), though at somewhat different paces, which gives rise to the clear SES gradient in Utah and Saguenay when farmers are excluded.

We next consider higher-order births, the main interest when examining fertility decline because it was more a decline in the number of births than a change in marriage and transition to parenthood (Coale and Watkins 1986). Figure 3 shows SES differences across populations by transitional phase. In the pre-transitional phase (P1), the higher occupations have the highest fertility in Scania whereas the unskilled have the lowest. In no other population can the higher occupations be characterized as having particularly high fertility in the pre-transitional period. Thus, there is only very limited support for the idea that the higher-SES groups universally have high marital fertility before the fertility transition. In fact, only Scania conforms to this image. In Utah, skilled workers and farmers have the highest fertility levels, and in Saguenay, the lower skilled and the farmers have the highest fertility levels. In Alghero, SES differences are small overall except for somewhat lower birth risks among the higher occupations. It is nevertheless possible that marital fertility in high-SES groups was higher in these populations further back in time before our study period begins and that an early fertility decline occurred in this SES group leading to a convergence to majority levels.

In the early-transitional phase (P2), higher occupations show the lowest marital fertility in all populations. Clearly, this supports the idea that the higher-SES groups are forerunners in the decline and early adopters of family limitation. Stockholm and Saguenay (excluding farmers) show clear SES gradients where higher SES is associated with lower fertility. In the late-transitional phase, there has been a decline in all SES groups. Although farmers and the unskilled still have the highest fertility, some convergence occurs among other groups.

Considering changes over time, the early decline in the higher occupations is even more striking. Between the pre- and early-transitional phases when only a limited fertility decline occurs overall, as shown in Table 4, higher-order birth risks in the highest SES group decline by 25–60 per cent. Although we lack data for pre-transitional Stockholm, the SES pattern in the early-transitional phase is consistent with a similar change occurring there. Between the early- and late-transitional phases, all SES groups experience a decline, and there is some convergence in higher-order fertility across SES groups in the populations. Thus, higher occupations emerge early in the transition as a low fertility group to which other groups converge. Farmers and unskilled workers are clear laggards in the process, and even in the post-transitional period (P4) in Scania, they have considerably higher fertility than other groups.

6. Discussion

The findings of this analysis can be easily summarized. There was substantial variety in the SES patterns of fertility in the different populations of Europe and North America that we studied. This result seems to contradict the generalizations often made in the literature. The most consistent pattern was found for higher-order births whereas for first births, the heterogeneity between populations was larger. This result is also what could be expected because entry into parenthood was as related to fertility as to marriage and establishing a household. It is also well-known from previous research that the historic fertility decline was mainly a reduction in marital fertility as more people began to reduce family size, rather than a by-product of changing marriage patterns. This factor also makes higher-order fertility more important and relevant when studying factors related to the fertility transition.

It is clear, however, that prolonged intervals between marriage and first births were also a notable aspect of the decline in most of our populations. Similarly, longer inter-birth intervals were crucial in the transition and indicated the spacing of births as important in the transition in addition to parity-specific stopping, which has always been the main focus in the literature. This is in line with other research highlighting the role of spacing as an important aspect of the fertility transition (e.g., Bean et al. 1990; Szreter 1996; Szreter and Garrett 2000; Garrett et al. 2001).

Turning to SES differences, which was the main focus of our analysis, we found only very limited support for the hypothesis that the high-SES groups had higher fertility before the fertility transition. In fact, only in one of our studied populations, Scania in southern Sweden, did we find this pattern. Previous findings about high fertility among various elite groups were often based on analyses of net fertility, implying that changing marriage patterns might have been driving much of the early decline of higher-SES fertility (see, e.g., Cummins 2013). Therefore, based on the evidence from these different contexts, we found neither support for the generalization of higher marital fertility among the upper classes nor for the opposite claim of low fertility in this group before the transition. Instead, farmers had high fertility in some contexts and workers had high fertility in other contexts. This does not rule out the possibility that the higher-status groups experienced an earlier fertility decline, and converging levels of marital fertility long before the time when rates of overall marital fertility declined secularly. It appears that SES differences in fertility in pre-transitional society were highly dependent on local contexts and conditions for childbearing; something that was stressed by Szreter in his model of “communicating communities”, in which SES and geography (and gender) interacted in determining fertility outcomes through social influence and interaction during the British fertility decline (Szreter 1996; Garrett et al. 2001). Further research is required to study these context-specific conditions and how they interact with SES in these populations.

We found much more support for the idea that the high status group acted as forerunners in the transition once it began. Overall, the high-SES group was first not only to reduce its fertility, especially when examining higher-order births, but also to increase the intervals between marriage and the first birth. In some cases, the differences in timing of the decline were not that significant between classes whereas in other cases, they were prominent.

However, in all cases the high-SES families were among the first to change their behaviour. As the transition progressed, more groups joined the transition leading to at least some convergence between SES groups. However, in most cases, farmers and unskilled workers continued to have relatively high fertility late in the transition.

Considering Scania, where we had data for all four transitional phases, this pattern was also very clear. The higher occupations were forerunners in the process of declining higher-order birth risks followed by all other groups in the subsequent period. However, because of different starting points and different paces of the decline, farmers and unskilled workers also had much higher fertility in the post-transitional phase (based on higher-order births) than the other groups (a difference of approximately 30 per cent).

There were, of course, some limitations of the analysis. We did not have identically structured data in all populations, and the contexts also forced us to modify the models somewhat, which meant that they were not completely identical. However, compared to previous research in this field, we went a long way to make our analysis as comparable as possible, using individual-level longitudinal data and an identical class scheme. Similarly, we did not have data for all study populations covering the entire transitions, which implied that results especially for the post-transition phase were rather tentative.

It is difficult to fully link our results to the major theoretical explanations previously discussed. Clearly, the often observed higher fertility of farmers made good economic sense in a society where manual labour at the farm was important and where productive and reproductive work were localized close to one another. It is not as clear why unskilled workers had more children once they had the chance to marry. Instead, the rather large differences in SES patterns across populations indicate a significant role played by local contextual factors in explaining these patterns.

The early fertility decline of the highest SES group seemed much more general but is also difficult to reconcile with several explanations advanced in the literature. It seems highly unlikely that this early decline could be explained by the increased labour force participation of married women and thus higher opportunity costs of children because women in these groups rarely worked for pay. Moreover, we have no indication of a change in this variable for the women of this group. Similarly, it appears unreasonable that the fertility decline of the higher occupations could be explained by declining benefits of children stemming from either less labour input or increased intergenerational transfers through the market or state. Children in these families did not work in factories or as farm servants, and the transfers from the state did not begin until later and, even then, would have been more important to the living standards of the lower-status groups. Also considering the quantity-quality trade-off, at least part of the highest SES group as defined here should have had the economic means to invest in their children's education without limiting the quantity. Moreover, at least in some of our study contexts, it is questionable how important educational investments were in this period (see Bengtsson and Dribe 2014; Molitoris and Dribe 2016).

There might have been some effect of an earlier decline in infant and child mortality in the high-SES group, but it seems far too small to explain the entire SES difference in the

decline. Furthermore, the mortality development of the higher-status groups did not always differ from the mortality development of the working classes (Bengtsson and Dribe 2014), while clear SES differences in child mortality was present for instance in Stockholm (Burström and Bernhardt 2001; Molitoris 2015). Another possible factor, which has been discussed in relation to declining fertility of the high-SES groups in other contexts, is changes in inheritance laws affecting the possibilities for the elite to transfer enough resources to their children to safeguard their social standing (e.g., Bardet 1990; Perrenoud 1990). As far as we know, there were no such changes in inheritance laws affecting any of our populations at the time of the fertility transition. In addition, we have no evidence of other societal changes in this period that would have made social reproduction in the high-status group more difficult or could have provided new incentives to limit fertility.

The innovation-diffusion theory is clearly consistent with an early decline among the upper classes (cf. Rogers 1962; Haines 1989a). Higher social status is usually associated with the early adoption of new behaviour, and the almost universal pattern of early decline among the upper classes corresponds to this idea. Aside from this early adoption of family limitation in the high-SES group, however, there was no consistent SES gradient in the decline that could be expected from an innovation-diffusion perspective where the innovation spread from early adopters (high SES) to early majority (middle SES) and later to the laggards (low SES). Moreover, the fact that the empirical pattern is consistent with predictions of a theory does not prove the theory correct. We do not know much concerning how the new fertility behaviour spread in these societies and what factors explained the beginning of the process.

Even though the focus has been on SES differentials, what was striking in all our contexts was the high degree of simultaneity in the decline. There were important differences by SES, but all groups participated in the transition. This result clearly shows that the changes occurring in society at this point in history affected all groups in society, although with forerunners and laggards.

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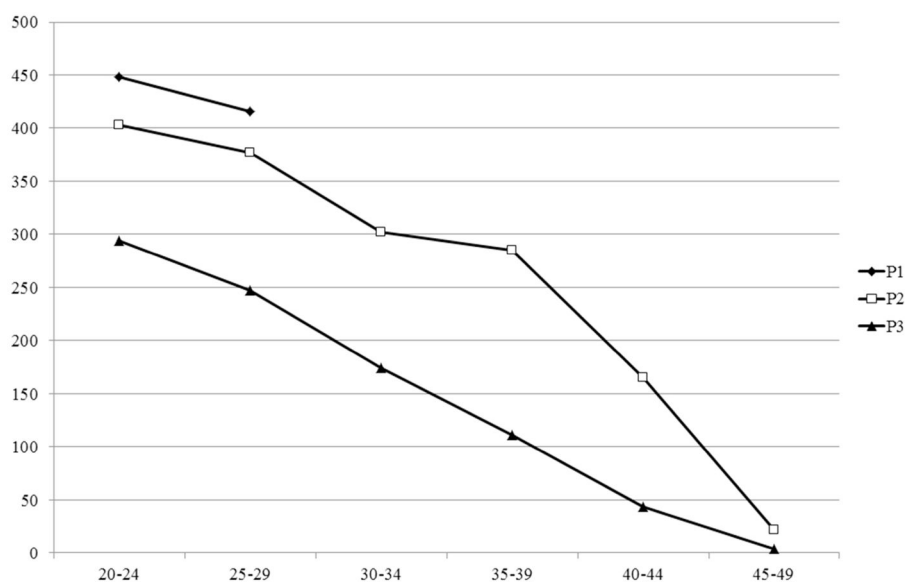
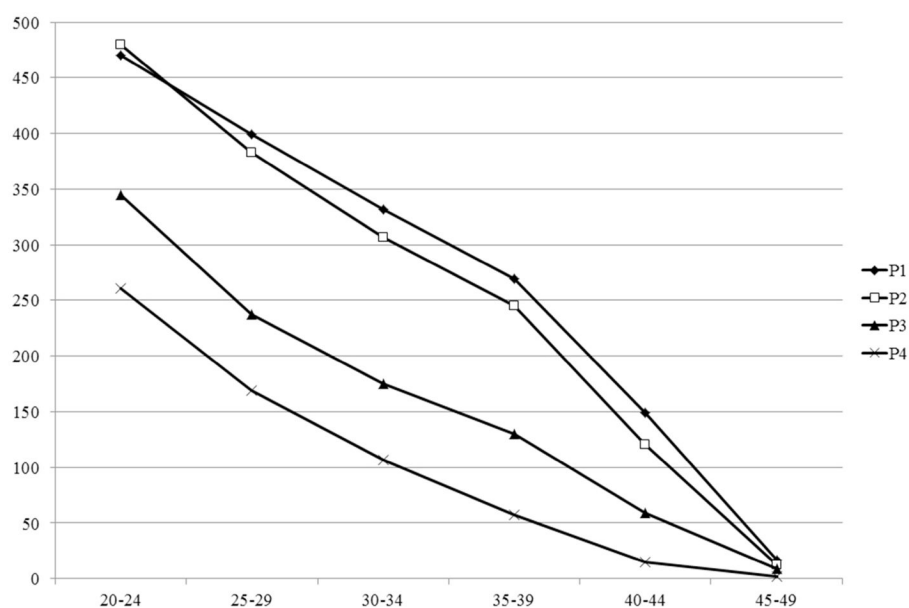
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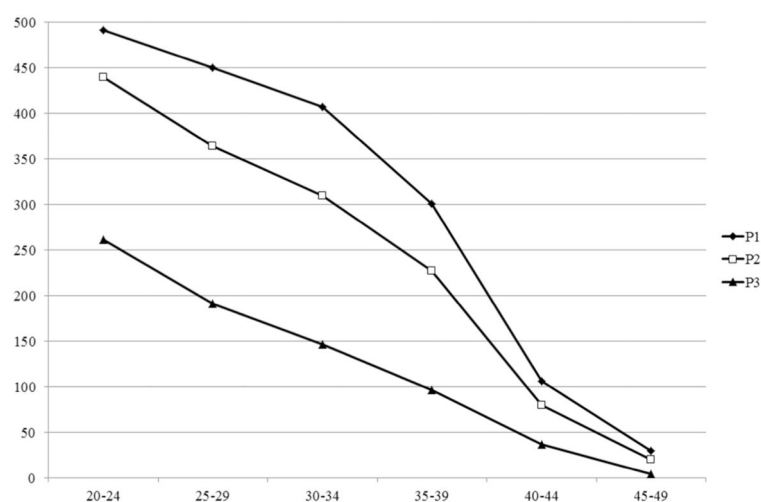
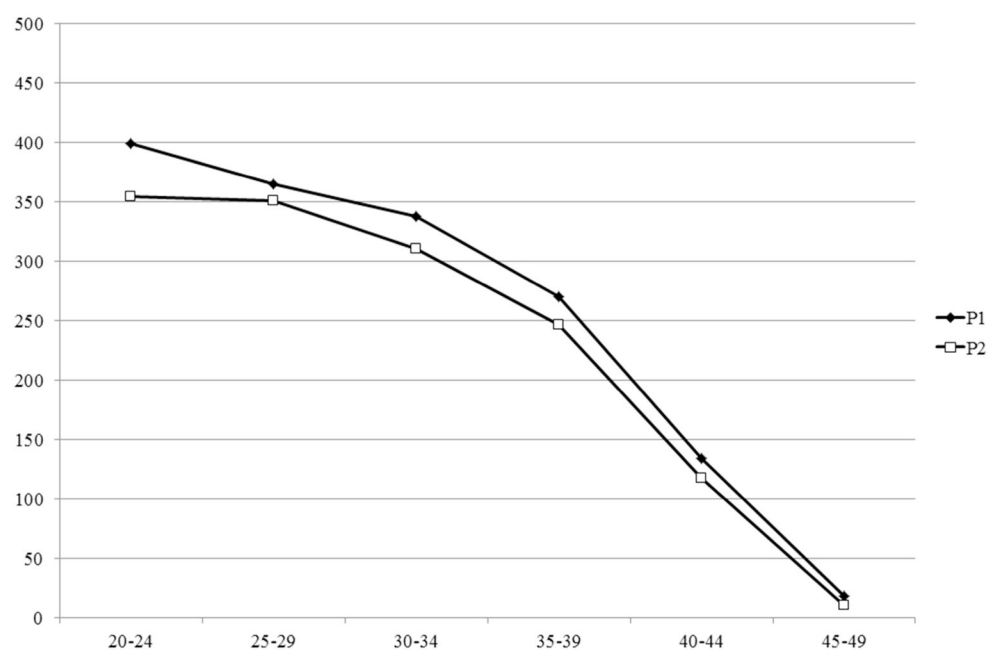
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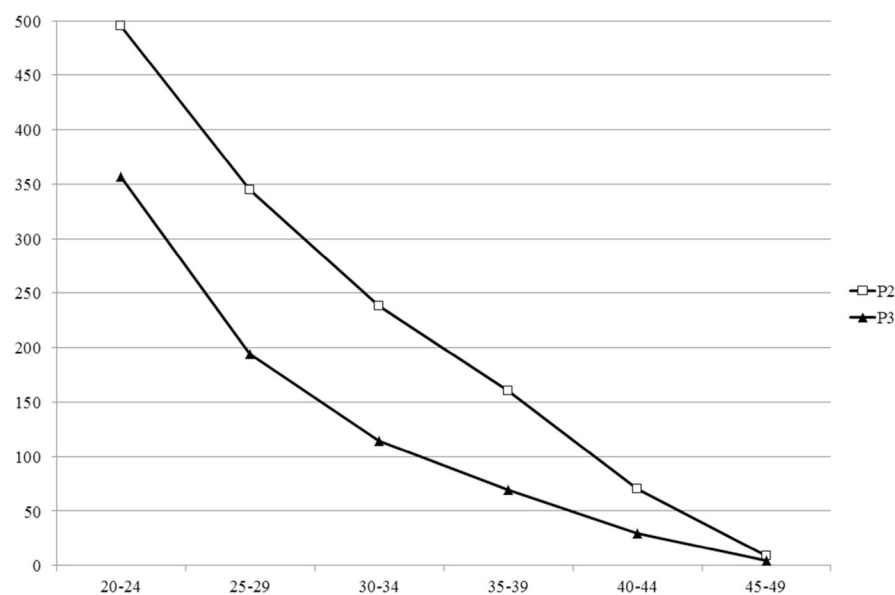
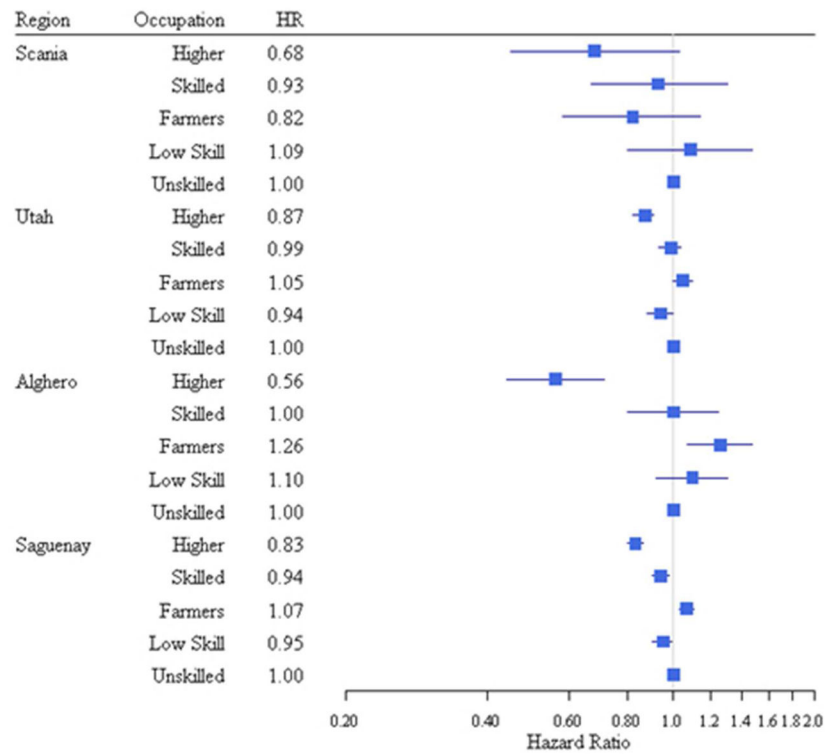
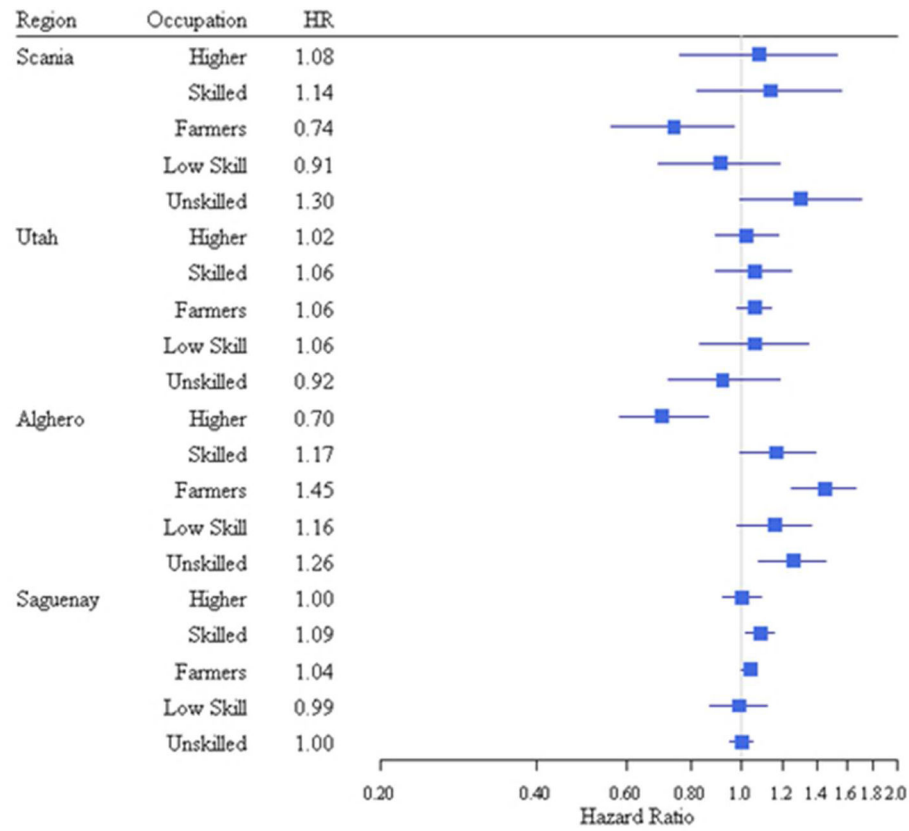
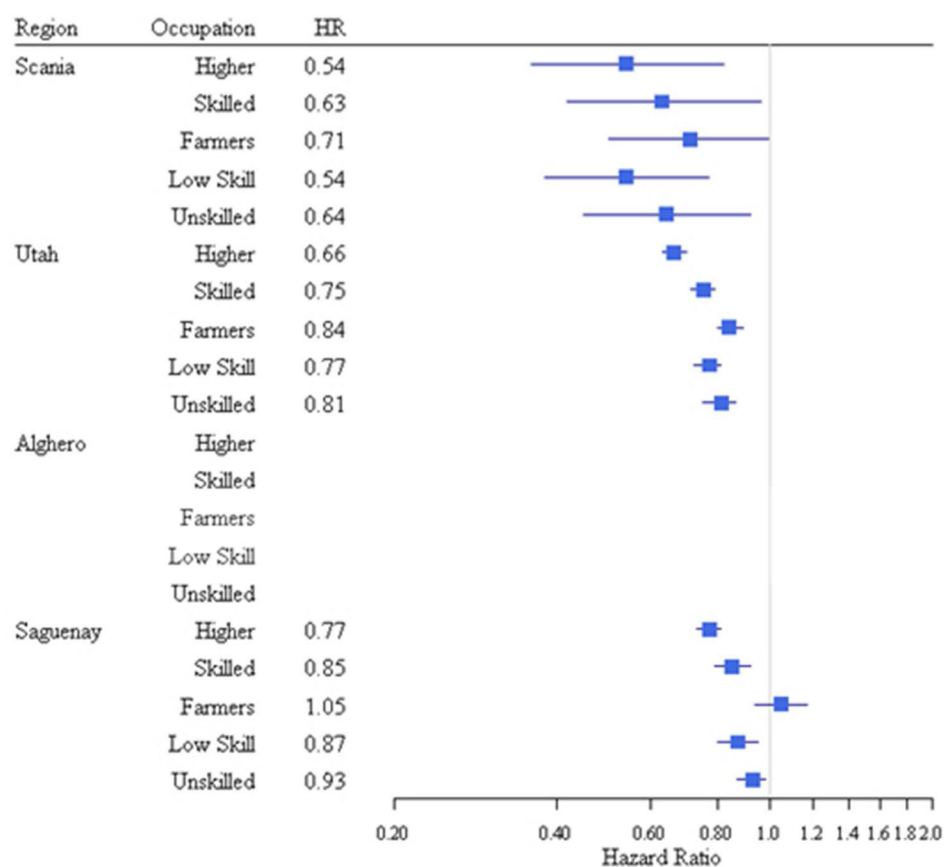


Figure 1.
Age-specific marital fertility in ages 20–49 in the different populations by transition phase





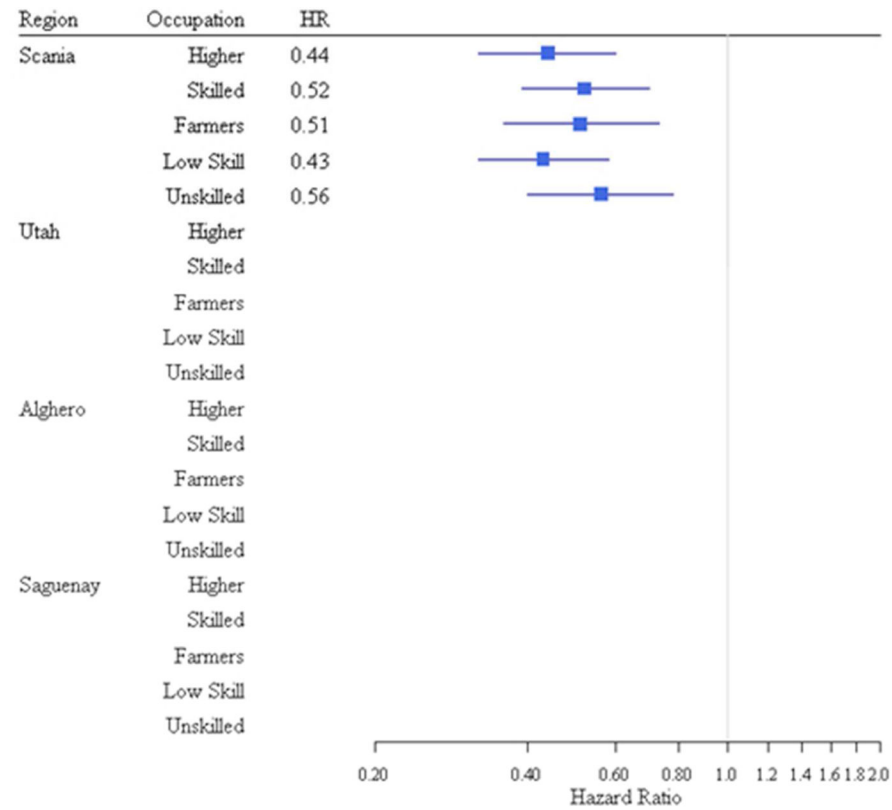
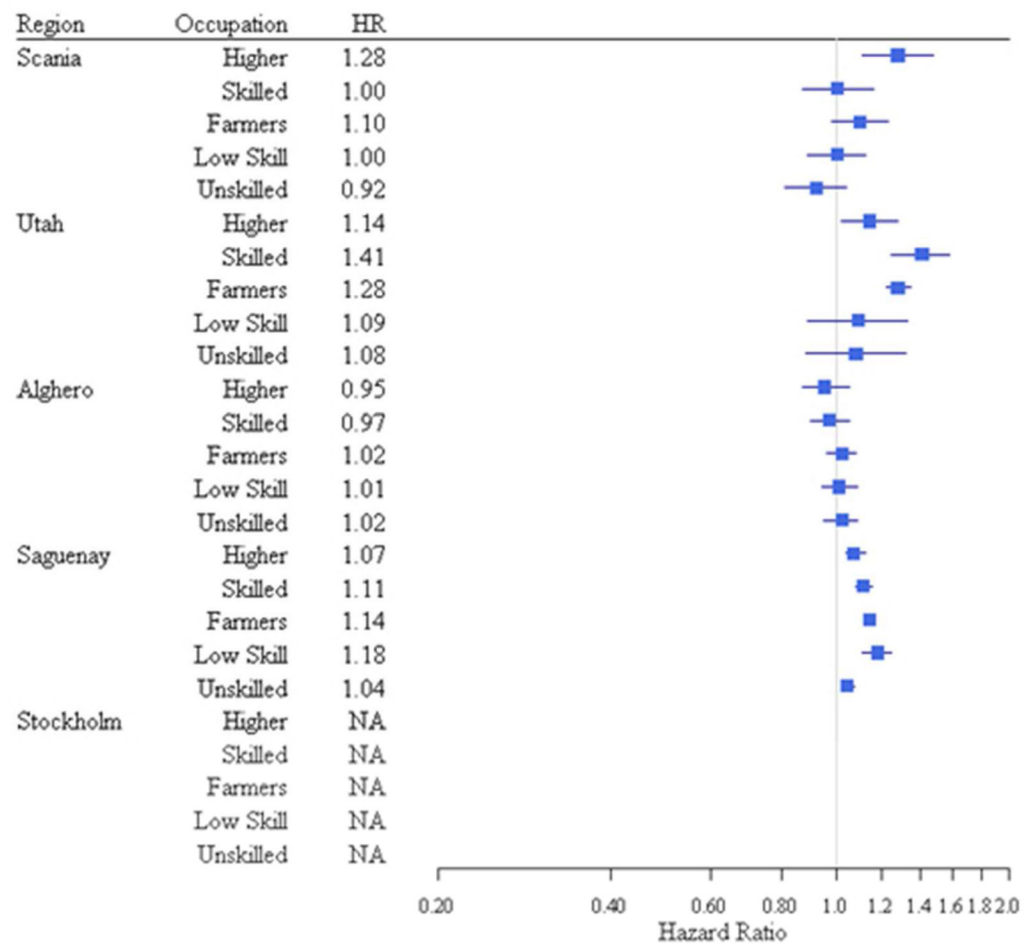
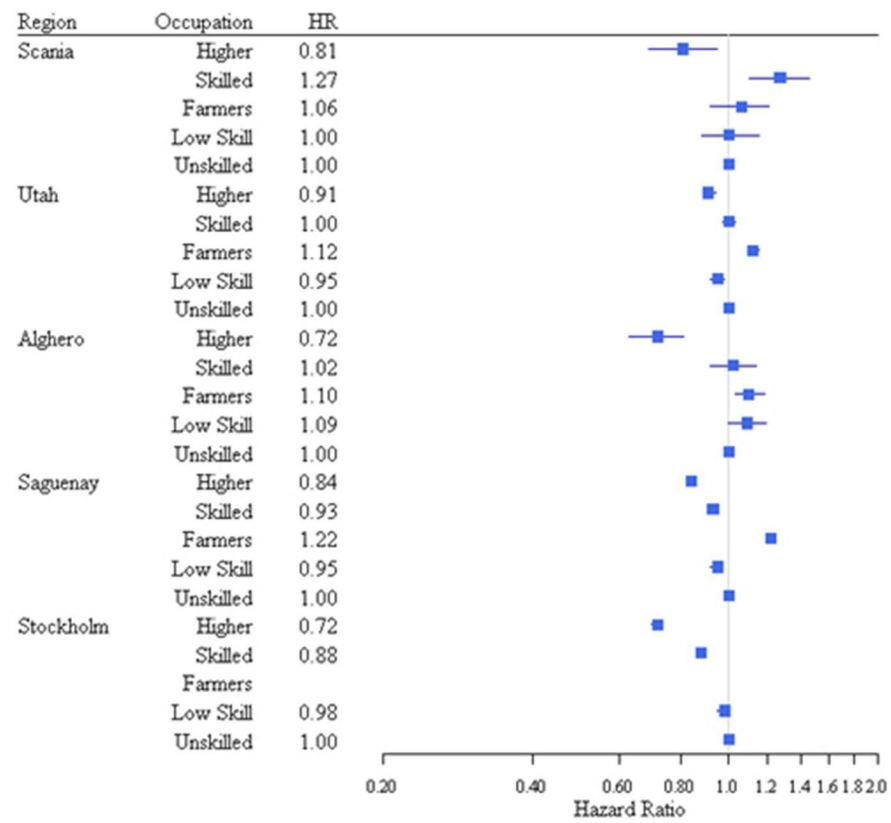
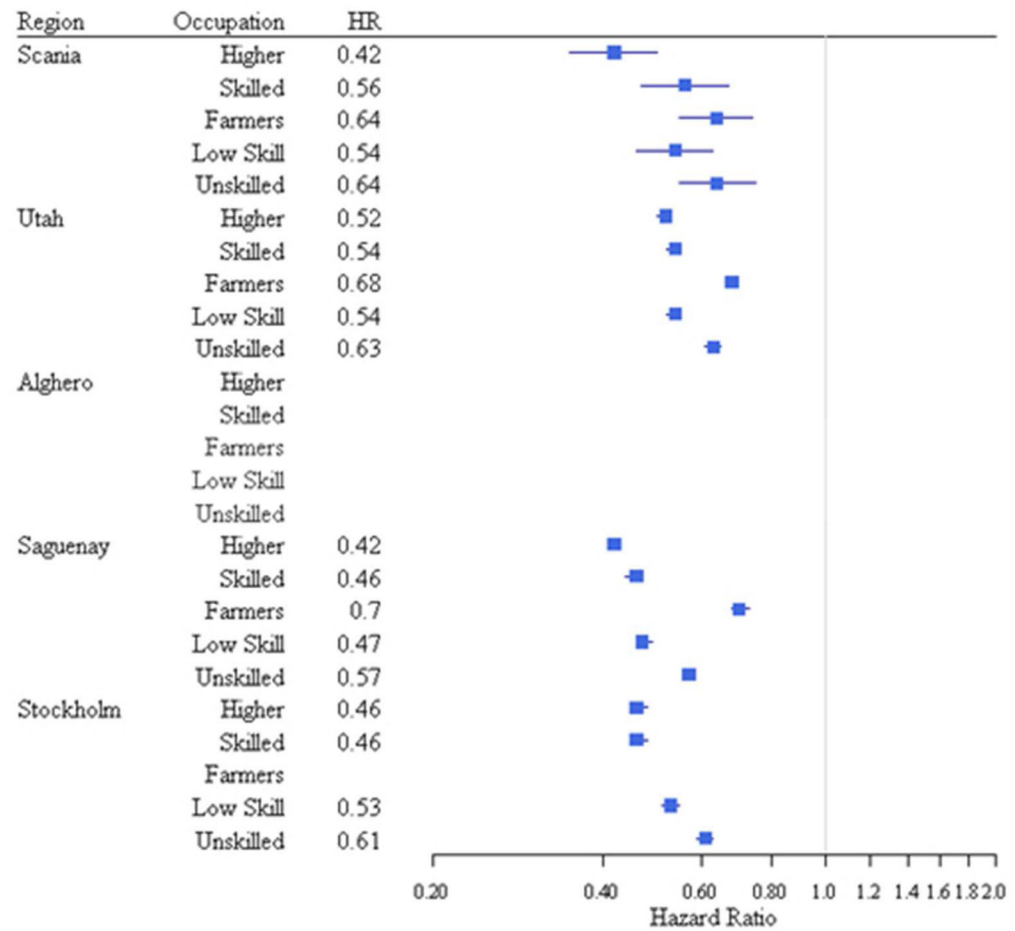


Figure 2.
Hazard ratios of first birth by transition phase and SES. Net effects from interaction models with unskilled in P2 as the reference category (HR=1)
Note: Net effects from interaction models, including controls for SES, age of woman, place of residence, and in the case of Utah, LDS status.







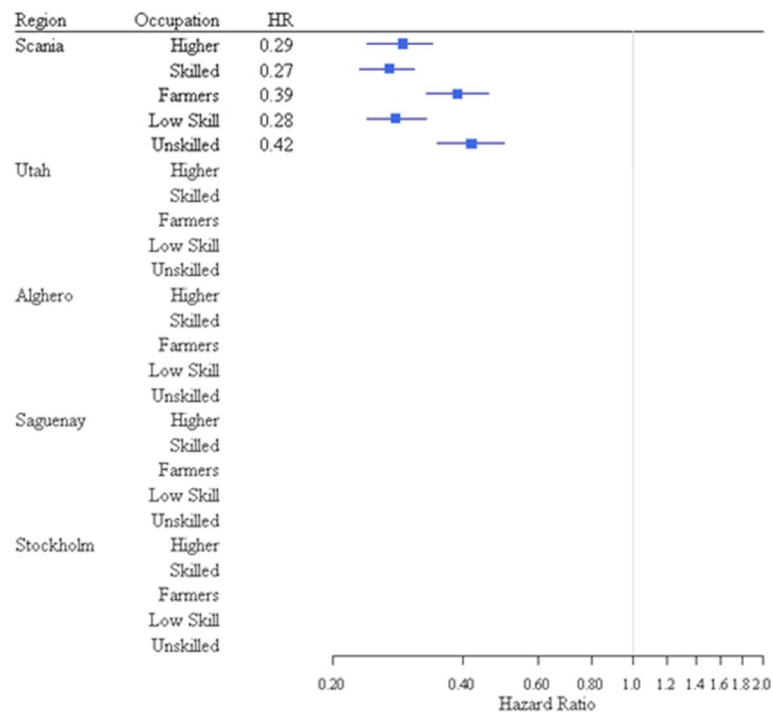


Figure 3.

Hazard ratios of higher-order births by transition phase and SES. Net effects from interaction models with unskilled in P2 as the reference category (HR=1)

Note: Net effects from interaction models, including controls for SES, age of woman, place of residence, survival status of previous child (higher order births) and in the case of Utah, LDS status.

Source: As for Table 1.

Table 1

Time periods corresponding to different transition phases in the included populations (total marital fertility in ages 20–49 in parentheses).

	P1 Pre-transition	P2 Early transition	P3 Late transition	P4 Post-transition
Scania, Sweden	1815–1879 (8.2)	1880–1909 (7.7)	1910–1934 (4.8)	1935–1968 (3.1)
Utah, USA	1850–1879 (<i>NA</i> *)	1880–1919 (7.8)	1919–1969 (4.4)	<i>NA</i>
Alghero, Italy	1866–1915 (7.6)	1916–1935 (6.9)	<i>NA</i>	<i>NA</i>
Stockholm, Sweden	<i>NA</i>	1878–1909 (6.6)	1910–1926 (3.8)	<i>NA</i>
Saguenay, Canada	1842–1929 (8.9)	1930–1959 (7.2)	1960–1971 (3.7)	<i>NA</i>

Note:

* Only women born 1850 and later are included in the UPDB, which does not allow the calculation of total marital fertility in P1.

Sources: Scania: Bengtsson et al. (2012); Utah: Pedigree and Population Resource (2012); Alghero: Alghero Demographic Database, University of Sassari; Stockholm: The Roteman Archives, Stockholm City Archives; Saguenay: BALSAC Project (2014).

Table 2

Mean birth intervals (in years) in the different populations.

A. Marriage to first birth			
Scania	Utah	Alghero	Saguenay
P1	1.06	1.21	1.41
P2	1.18	1.47	1.64
P3	1.34	2.14	NA
P4	2.24	NA	NA

B. Interbirth intervals			
Scania	Utah	Alghero	Stockholm
P1	2.69	2.01	1.98
P2	2.60	2.58	1.87
P3	3.05	3.46	2.25
P4	3.86	NA	NA

Source: As for Table 1.

Table 3

Distribution of core variables used in regressions (%).

	Scania		Utah		Alghero		Stockholm		Saguenay	
	FB	HOB	FB	HOB	FB	HOB	FB	HOB	FB	HOB
SES										
Higher occupations	15.5	14.7	23.1	19.7	14.9	6.0	NA	26.9	14.3	12.1
Skilled workers	17.7	15.6	12.2	11.5	11.5	9.5	NA	28.1	10.4	10.2
Farmers	19.9	24.8	23.8	30.1	36.2	46.7	NA	NA	25.4	27.3
Lower skilled workers	29.0	27.2	8.4	7.6	15.6	13.5	NA	20.8	6.9	6.9
Unskilled workers	15.3	15.9	4.2	4.5	21.7	24.3	NA	23.1	23.6	26.1
Unknown	2.6	1.8	28.3	26.7	0.0	0.0	NA	1.1	19.5	17.4
Transition phase										
P1	27.1	37.6	4.0	3.3	65.2	71.5	NA	NA	23.9	21.8
P2	13.6	19.0	50.4	54.0	34.8	28.5	NA	59.5	58.3	45.1
P3	16.0	16.6	45.6	67.5	NA	NA	NA	40.5	17.7	33.0
P4	43.3	26.7	NA	NA	NA	NA	NA	NA	NA	NA
Age of woman										
15–24	29.4	7.3	42.1	5.7	43.8	14.8	NA	6.1	77.6	26.2
25–29	31.3	18.8	36.2	14.2	21.3	21.8	NA	20.1	16.8	27.9
30–34	16.7	23.5	14.5	18.3	12.7	21.9	NA	26.7	4.1	21.7
35–39	8.8	22.3	5.4	19.5	8.3	18.4	NA	23.3	1.2	15.4
40–49	13.7	28.1	1.7	42.2	13.9	23.1	NA	23.7	0.2	8.8
Time at risk (person years)	4,814	55,473	142,530	1,862,992	11,691	63,625	NA	548,701	60,292	714,209
Births	2,000	9,569	80,118	319,079	3,797	18,366	NA	91,695	43,925	258,765

Note: FB: First births, HOB: Higher-order births.

Source: As for Table 1.

Table 4

Hazard ratios of birth by transition phase in the different populations.

A. First births				
	Scania	Utah	Alghero	Saguenay
P1	1.06	1.07 ***	1.20 ***	1.02
P2	1.00	1.00	1.00	1.00
P3	0.67 ***	0.77 ***	NA	0.93 ***
P4	0.53 ***	NA	NA	NA
Log Likelihood	-13,696	-826,236	-29,182	-430,838
LR Chi ²	566 ***	3,068 ***	606 ***	821 ***

B. Higher-order births				
	Scania	Utah	Alghero	Saguenay Stockholm
P1	0.99	1.19 ***	0.97	1.03 *** NA
P2	1.00	1.00	1.00	1.00
P3	0.55 ***	0.56 ***	NA	0.53 *** 0.56 ***
P4	0.30 ***	NA	NA	NA
Log Likelihood	-82,941	-3,863,337	-165,816	-2,481,106 -1,024,195
LR Chi ²	4,676 ***	109,816 ***	5,157 ***	70,672 *** 32,439 ***

Note: Model includes controls for SES, age of woman, place of residence, survival status of previous child (higher order births) and in the case of Utah, LDS status.

* p<0.05,
** p<0.01,
*** p<0.001

Source: As for Table 1.